UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,175	09/04/2001	Nobuhiko Ogura	Q65952	9850

7590 08/12/2003

SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037-3202

EXAMINER
TRAN, MY CHAU T

ART UNIT	PAPER NUMBER
1639	

DATE MAILED: 08/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/944,175	OGURA, NOBUHIKO	
	Examiner	Art Unit	
	My-Chau T. Tran	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. Applicant's amendment filed 6/24/03 in Paper No. 10 is acknowledged and entered. Claim 1 is amended by the amendment.

2. Claims 1-22 are pending.

Drawings

3. The corrected or substitute drawings were received on 6/24/03. These drawings are acceptable.

4. Claims 1-22 are treated on the merit in this Office Action.

Withdrawn Rejections

5. The previous rejection 35 USC 112, first paragraph, for claim 4 has been withdrawn since the rejection was meant for claim 10 that recites "one-dimensional spotting".

6. The previous rejection 35 USC 112, first and second paragraph, for claim 10 has been withdrawn in view of applicant's argument that "[b]y looking at the two-dimensional arrangement of the spots in Figure 6, one of skilled in the art would understand that one-dimensional arrangement of spots would be accomplished similarly to two-dimensional spotting, except not requiring the second dimension. For example, a two-dimensional orientation includes configures such as a square, rectangular, hexagonal or other array, or a circular array with radial

lines or concentric rings. In contrast, a one-dimensional array is linear" (pg. 6, lines 3-4 of response).

7. The previous rejection 35 USC 112, first paragraph, for claim 20 has been withdrawn in view of applicant's argument that "[t]he claimed area sensor is directed to a CCD camera" (pg. 6, lines 3-4 of response).

8. The previous rejections 35 USC 112, second paragraph, for claims 19-21 have been withdrawn in view of applicant's argument that there is proper antecedent basis for claims 19-21 to Claim 1 (see pg. 6, lines 10-11 of response).

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Maintained Rejections

Claim Rejections - 35 USC § 102

10. Claims 1-8, 12-18, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Ullman et al. (US Patent 6,103,537).

"The present claim recites a biochemical analyzing method. The method steps comprise of fixing the probes on a substrate, binding a target with the probes to capture the target, fractionating the captured target, detecting the fractionated target, and quantitatively analyzing the detected target."

Ullman teaches a method of capillary electroseparation specific binding assay (col. 4, lines 33-51). This method includes applying an electric potential to achieve electroseparation of

the free and bound labeled species (col. 23, lines 17-38). In Ullman, the angle is 0° and the direction of migration is affected by the direction or orientation of the channel formed on a surface (col. 4, lines 47-50). A member of the specific binding pair (probe) is bound to synthetic particles (substrate) (col. 5, lines 8-16) (fixing the probe on a substrate). The particles are latex, organic, inorganic polymers, or lipid bilayers (col. 13, lines 29-53). The analyte (target) is antigens, antibodies, ligands, or DNA (col. 6, lines 2-15). A label can be bound or unbound to a specific binding pair (col. 11, lines 12-30; col. 9 lines 25-46). The label can be a dye, enzyme, fluorescent molecule or chemiluminescent molecule. The binding determination can be performed qualitatively or quantitatively (col. 20, lines 7-21). The method further discloses employing sieving gel in the electroseparation medium to assist in providing localization of the bound complex and achieves appropriate separation of free and bound species (col. 24, lines 31-40).

Response to Arguments

11. Applicant's argument(s) directed to the above rejection under 35 USC 102(b) as being anticipated by Ullman et al. (US Patent 6,103,537) for claims 1-8, 12-18, and 22 were considered but they are not persuasive for the following reasons.

Applicant contends that "[U]llman fails to disclose all of the claimed features". "[U]llman fails to disclose fixing probes that are selected in advance on a substrate, and detecting only the fractionated target, as recited in independent claim 1." And that "[U]llman does not disclose when labeling occurs with respect to binding or fractionating, as recited in claims 14 and 16, and 15 and 17, respectively."

Applicant's arguments are not convincing since Ullman et al. do disclose all of the claimed features. Ullman et al. disclose a member of the specific binding pair (probe) is bound to synthetic particles (substrate) (col. 5, lines 8-16) (e.g. fixing the probe on a substrate) and define "substance capable of binding to a member of a specific binding – a compound or composition to be detected or analyzed for its specific binding properties" (col. 5, lines 66-67 to col. 6, line 1; col. 8, lines 41-45) (e.g. probes selected in advance).

Ullman et al. further discloses employing sieving gel in the electroseparation medium to assist in providing localization of the bound complex (fractionated target) and achieves appropriate separation of free and bound species (col. 24, lines 31-40) (e.g. detecting only fractionated target). Thus Ullman et al. disclose ***all*** the limitation of claim 1.

Additionally, Ullman et al. disclose two type of assay that a sandwich assay reaction and a competitive binding assay (col. 27, lines 13-45). In the sandwich assay reaction an antibody is bound to the bead (e.g. fixed probe), which is specific to an antigen (e.g. target). After the antigen is bound to the antibody, a label antibody, which is specific to the "same" antigen, is added to bind to the antigen (e.g. labeling the target after fractionating. In the competitive assay, the reaction comprise of labeled and unlabeled antigen (e.g. target), which are specific to the antibody, and antibody (e.g. probe) attached to the bead (e.g. labeling the target before binding to the probe). The label includes both fluorescent molecule and chemiluminescent molecule (col. 9, lines 39-45).

Therefore Ullman et al. do disclose ***all*** of the presently claimed features.

Claim Rejections - 35 USC § 103

12. Claims 1-2 and 9-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alfenito (US Patent 6,355,419 B1) in view of Ichie (US Patent 5,796,112).

"The present claim recites a biochemical analyzing method. The method steps comprise of fixing the probes on a substrate, binding a target with the probes to capture the target, fractionating the captured target, detecting the fractionated target, and quantitatively analyzing the detected target. The probes are fixed on the substrate by spotting to form plurality of spots."

Alfenito disclose several different methods of detecting a target nucleic acid species including steps of providing an array of probes affixed to a substrate (col. 2, lines 17-19). The array is prepared by spotting the oligonucleotide probes onto a support (col. 24, lines 46-67; col. 28, lines 2-33). The target nucleic acid is hybridized (binding) to the probe (col. 2, lines 29-31). In one method the target are sorted (fractionated) by an electric field (col. 36, lines 19-33). The probes may be labeled with fluorescent dyes or chemiluminescent systems (col. 14, lines 54-57). Charged-coupled device (CCD) detectors serve as active solid supports that quantitatively detect and image, which is a two-dimensional pattern, the distribution labeled target molecules in probe-based assays (col. 41, lines 20-51).

The method of Alfenito does not expressly disclose that the target is detected by three-dimensional scanning.

Ichie disclose a method of detecting an optical spot of a sample that is labeled with a fluorescent dye (col. 1, lines 38-54). The sample is scanned three-dimensionally or two-dimensionally.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the detection of a target by three-dimensional scanning as taught by Ichie in the method of Alfenito. One of ordinary skill in the art would have been motivated to include the detection of a target by three-dimensional scanning in the method of Alfenito for the advantage of providing an image with more depth. Since both Alfenito and Ichie disclose the method of detecting fluorescent samples (Alfenito: col. 41, lines 20-31; Ichie: col. 1, lines 38-54).

Response to Arguments

13. Applicant's argument(s) directed to the above rejection under 35 USC 103(a) as being unpatentable over Alfenito (US Patent 6,355,419 B1) in view of Ichie (US Patent 5,796,112) for claims 1-2 and 9-21 were considered but they are not persuasive for the following reasons.

Applicant alleges that "[t]he Examiner's proposed combination of references fails to disclosed or suggest all of the claimed combinations of features." Alfenito does not disclosed that the "[t]argets are fractionated utilizing the difference in molecular weights", "[t]he samples are one-dimensionally or two-dimensionally spotted to form a plurality of spots", and "[t]he sequence of labeling with respect to binding and fractionating is not believe to be disclosed". "[I]chie does not disclose that the samples are one-dimensionally or two-dimensionally spotted to form a plurality of spots". Thus "[t]he Examiner's proposed combination of references fails to disclosed or suggest all of the claimed combinations of features."

Applicant's arguments are not convincing since the combination of references (e.g. Alfenito (US Patent 6,355,419 B1) and Ichie (US Patent 5,796,112)) do disclosed ***all*** the features of the presently claimed invention. Alfenito disclose in one method the target are sorted

(fractionated) by an electric field (col. 36, lines 19-33) (e.g. fractionating the captured target to produce a fractionated target). However, the claimed feature that the "[t]argets are fractionated utilizing the difference in molecular weights" is not cited in the rejected claims (e.g. claims 1-2 and 9-21), but rather in the claims 3-8, which are ***not*** rejected by Alfenito and Ichie. Since these dependent claims (e.g. claims 3-8) were not included in this rejection as being obvious over Alfenito and Ichie, the argument is considered moot.

Alfenito disclose providing "substrates on which arrays of oligonucleotide probes are fixed, wherein each probe is separated from its neighboring probes by a physical barrier that is resistant to the flow of the sample solution" (col. 5, lines 18-22) (e.g. as define by applicant in pg. 6, lines 3-4, of response wherein "a one-dimensional array is linear"). Alfenito further disclose a "method for making the arrays of oligonucleotide probes that are separated by physical barriers. In a preferred embodiment, a grid is applied to the substrate using an ink-jet head that applies a material which reduces the reaction volume of the array" (col. 5, lines 24-28) (e.g. two-dimensional spotting). Thus Alfenito do disclose that "[t]he samples are one-dimensionally or two-dimensionally spotted to form a plurality of spots".

Additionally, Alfenito teach that "an alternative luminescent detection procedure involves the use of fluorescent or chemiluminescent reporter groups attached to the target molecules" (col. 42, lines 18-21) (e.g. labeling the target with fluorescent or chemiluminescent compound). However, whether the labeling occurs before binding of target to the probe or after fractionating the target would be a choice as experimental design and is considered within the purview of the prior art.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Alfenito disclose "[t]he integrated CCD detection approach enables the detection of molecular binding events on chips. The detector rapidly generates a two-dimensional pattern that uniquely characterizes the sample" (col. 41, lines 43-46). Ichie disclose "[t]he laser scanning optical apparatus may have such a feature that a surface of the sample is coated with a predetermined photosensitive agent and a predetermined pattern is formed on the photosensitive agent, based on exposure with irradiation of the Bessel beam" (col. 5, lines 18-22). Both Alfenito and Ichie disclosed method of detecting fluorescent samples on the surface using an optical apparatus (e.g. analogous art) therefore there is reasonable expectation of success to include the detection of a target by three-dimensional scanning as taught by Ichie in the method of Alfenito.

Therefore, the combination of Alfenito and Ichie do disclosed ***all*** the features of the presently claimed invention.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to My-Chau T. Tran whose telephone number is 703-305-6999. The examiner is on Increased Flex Schedule and can normally be reached on Monday: 8:00-2:30; Tuesday-Thursday: 7:30-5:00; Friday: 8:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew J. Wang can be reached on 703-306-3217. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9307 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1123.

mct
August 11, 2003

PADMASHRI PONNALURI
PRIMARY EXAMINER